What is claimed is:

1. A field emission device comprising:

a substrate;

a cathode electrode formed on the substrate and an electron emission source formed on the cathode electrode;

a gate electrode having a gate hole corresponding to the electron emission source;

a gate insulating layer which insulates the gate electrode and the cathode electrode from each other;

a mesh grid which is placed on the gate electrode and in which an electron-controlling hole corresponding to the gate hole is formed;

a tension member which allows the mesh grid to closely contact the gate electrode, fixes the mesh grid in the gate electrode, and applies a tensile force to the mesh grid; and

a grid insulating layer which insulates the mesh grid and the gate electrode from each other.

2. The field emission device of claim 1, wherein the grid insulating layer is formed on the bottom side of the mesh grid.

3. The field emission device of claim 1, wherein the grid insulating layer is formed of one material selected from amorphous silicon and silicon oxide.

4. The field emission device of claim 1, wherein the grid insulating layer is formed of silicon oxide and is formed on both sides of the mesh grid.

5. The field emission device of claim 4, wherein a conductive layer is formed on an upper surface of the grid insulating layer opposite to an anode plate.

6. The field emission device of claim 1, wherein the mesh grid is formed of Invar.

7. A field emission display comprising:

an anode plate on which an anode electrode and a phosphor layer are formed inside of a front plate;

a cathode plate on which a field emission array including an electron emission source for emitting electrons corresponding to the phosphor layer and a gate electrode having a gate hole through which the electrodes pass is formed on a rear plate;

a mesh grid which closely contacts the field emission array on the rear plate and in which an electron-controlling hole corresponding to the gate hole is formed;

a tension member which fixes the mesh grid in the rear plate and applies a tensile force to the mesh grid;

a grid insulating layer which insulates the mesh grid and the field emission array from each other; and

a spacer provided between the cathode plate on which the mesh grid is installed and the anode plate corresponding to the cathode plate.

8. The field emission display of claim 7, wherein the grid insulating layer is formed on the bottom side of the mesh grid.

9. The field emission display of claim 7, wherein the grid insulating layer is formed of one material selected from amorphous silicon and silicon oxide.

10. The field emission display of claim 7, wherein the grid insulating layer is formed of silicon oxide and is formed on both sides of the mesh grid.

11. The field emission display of claim 10, wherein a conductive layer is formed on an upper surface of the grid insulating layer opposite to the anode plate.

12. The field emission display of claim 7, wherein the mesh grid is formed of Invar.

13. A method of manufacturing a field emission device, the method comprising:

(a) forming a field emission array including an electron emission source for emitting electrons and a gate electrode having a gate hole through which the electrons pass, on a substrate;

(b) manufacturing an additional mesh grid in which an electron-controlling hole corresponding to the gate hole is formed;

(c) thermally expanding the substrate on which the field emission array is formed and the mesh grid to be fixed onto the substrate;

(d) fixing the thermally-expanded mesh grid onto the substrate using a tension member; and

(e) cooling the substrate and the mesh grid at room temperature.

14. The method of claim 13, wherein in (c), the rear plate and the field emission array are heated at a temperature higher than an operating temperature of the field emission array.

15. The method of claim 13, wherein in (a), a fixing pad for fixing the tension member is formed on the substrate.

16. The method of claim 13, wherein in (b), a grid insulating layer is formed at least one side of the mesh grid.

17. The method of claim 16, wherein the grid insulating layer is formed of one material selected from amorphous silicon and silicon oxide.

18. A method of manufacturing a field emission display, the method comprising:

a) preparing an anode plate on which an anode electrode and a phosphor layer are formed inside of a front plate;

b) preparing a cathode plate on which a field emission array including an electron emission source for emitting electrons corresponding to the phosphor layer and a gate electrode having a gate hole through which the electrodes pass inside of a rear plate;

c) manufacturing an additional mesh grid in which an electron-controlling hole

corresponding to the gate hole is formed;

d) thermally expanding the rear plate on which the field emission array is formed and the mesh grid to be fixed onto the rear plate;

e) fixing the thermally-expanded mesh grid onto the substrate using a tension member; and

f) vacuumizing and sealing the anode plate and the cathode plate in the state that a spacer having a predetermined depth is interposed between the cathode plate and the anode plate.

19. The method of claim 18, wherein in (d), the rear plate and the field emission array are heated at a temperature higher than an operating temperature of the field emission array.

20. The method of claim 18, wherein in (b), a fixing pad for fixing the tension member is formed on the substrate.

21. The method of claim 18, wherein in (c), a grid insulating layer is formed at least one side of the mesh grid.

22. The method of claim 21, wherein the grid insulating layer is formed of one material selected from amorphous silicon and silicon oxide.

23. The method of claim 18, wherein e) comprises:

fixing the spacer in the anode plate using a binder; and

firing the phosphor layer together with the binder.